

HYPERION SERIES

MIL-DTL-38999, MODULAR, OPTOELECTRONIC CONNECTOR

100 Mbps to 2.125 Gbps • -55° to 95°C & 100 Mbps to 4.25 Gbps • -40° to 95°C



INTRODUCTION

Teledyne Reynolds, Inc.'s (TRI) Hyperion Series are MIL-DTL-38999, modular, optoelectronic connectors with a unique hybrid design that enable both high speed fiber optic communication and electrical power transmission in a single connector. TRI's broadband transceivers combine high data rates with operation in, both, hot and cold temperature extremes.

Housing the ruggedized transceiver in a MIL-DTL-38999 connector provides optimum protection and reliability in industrial, aviation and military applications.

In addition to simplifying maintenance and repair, Hyperion's modularized configuration allows for a multitude of fiber optic and electrical interface configurations per MIL-STD-1560. Fiber optic signals are transmitted via 16 AWG cavities, while the other cavities can be used for electrical signal and/or power transmission.

BENEFITS VS.

TRADITIONAL COPPER:

Reduced system weight
 Reduced EMI and EMP susceptibility
 Greater data transmission and range
 Smaller diameter harnesses
 Lower power consumption

BOARD MOUNT TRANSCEIVERS:

More ruggedized
 Easier field maintenance
 Higher temperature performance
 Reduced insertion loss
 Reduced multi-point failures
 Increased reliability
 Reduced board complexity & size

CONNECTOR OPTIONS

Shell Configuration: Wall Mount, Jam Nut Mount

Shell Size: 15, 17, 19, 21, 23, 25

Shell Plating: Nickel, Cadmium over Nickel – Stainless Steel shell is available

Connector Polarization: N, A, B, C, D

Channel Assignment: All 16 AWG cavities are available for optical channel use. Any cavities not used for fiber optics are available for electrical contacts. See MIL-STD-1560 for insert configurations.

FEATURES

- Withstands shock, vibration and humidity in harsh environments
- Connector material and plating available per MIL-DTL-38999
- Fiber optic interfaces MIL-PRF-29504/4 and /5 compliant
- Humidity and flammability per MIL-DTL-38999
- Durability and temperature per M38999 and M29504 (+95°C Max)
- Uses 50/125µm multimode fiber (62.5/125µm available)
- Allows for a multiple termini arrangements
- Connector insert configurations per MIL-STD-1560
- Single 3.3 V power supply and low nominal power consumption
- Transmitter disable function
- Receiver signal detect monitor
- Receiver GaAs PIN photodetector
- Transmits fiber optic signals via 16 AWG cavities
- Transmits electrical signals via all other contacts

TRANSCEIVER INTERCONNECTION OPTIONS

- Electrical pin PCB connections
- Flexible circuit assembly
- M32139, M83513 or equivalent cable assembly
- Custom interconnections available

COMPATIBLE FOR NETWORK PROTOCOLS	TRANSMISSION DISTANCE
Fibre Channel – 1GFC, 2GFC, 4GFC	150-500 meters
Fast Ethernet – 100 Mbps (100 Base-SX)	550 meters
Gigabit Ethernet – 1000 Mbps (1000 Base-SX)	550 meters



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RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MINIMUM	TYPICAL	MAXIMUM	UNIT	NOTES
Operating Temperature	TA	-40		+95	°C	
Supply Voltage	V _{CC}	3.0	3.3	3.6	V	
TX Differential Input Voltage (p-p)	V _{DIFF}	0.25		2.4	V	
Power Supply Noise (p-p)	NP		26		dB	

OPTICAL TRANSMITTERS

PARAMETER	SYMBOL	MINIMUM	TYPICAL	MAXIMUM	UNIT	NOTES
Supply Current	I _{CC}		55	100	mA	
Input Differential Impedance	Z _{diff}	85	100	115	Ω	1
Data Rate	BR	.100		4.25	Gbps	
Single Ended Data Input Swing	V _{in,PP}	250		1200	mV	
Transmitter Disable Voltage	V _D	2.0		V _{CC}	V	
Transmitter Enable Voltage	V _{EN}	0		0.8	V	2
Bit Error Rate	BER			10 ⁻¹²		3
Optical Output Power	P _{OUT}	-4.0	-2.0	+2.0	dBm	4, 7
Optical Output Wavelength	λ _{OUT}	840	850	860	nm	
Optical Modulation Amplitude	OMA	500	850		μW	5, 8
Total Jitter Contribution	TXΔDJ		20	70	ps	
Extinction Ratio	ER		8.0		dB	3
Optical Rise, Fall Time (20% to 80%)	t _{R,F}			80	pS	
Spectral Width	Δλ _{RMS}			0.85	nm	

OPTICAL RECEIVERS

PARAMETER	SYMBOL	MINIMUM	TYPICAL	MAXIMUM	UNIT	NOTES
Supply Current	I _{CC}		78	100	mA	
Data Rate	BR	.100		4.25	Gbps	
Single Ended Data Output Swing	V _{out,PP}	300	375	600	mV	
Signal Detect Assert	SD		-17.5	-16	dBm	
Signal Detect De-Assert	SD	-31	-19.5		dBm	
Signal Detect Normal	SDN	2.4		V _{CC}	V	
Signal Detect Fault	SDF	0		0.4	V	
Bit Error Rate	BER			10 ⁻¹²		
Optical Sensitivity			-18	-15	dBm	3
Optical Wavelength Input	λ _{IN}	770	850	870	nm	
Total Jitter Contribution	RXΔDJ		10	70	ps	6, 8
Data Output Rise/Fall Time	t _{R,F}		80	100	ps	
Signal Detect Hysteresis		0.5	2.1	3	dB	

NOTES:

- 1) AC coupled
- 2) Or open circuit
- 3) Tested with PRBS s/b 2⁻¹ test pattern
- 4) Class I Laser Safety per FDA/CDRH, EN (IEC) 60825 laser safety regulations
- 5) Equivalent extinction ratio specification for Fibre Channel. Allows for smaller ER at higher average power.
- 6) If measured with DJ-free data input signal, s/b 10¹² BER. In actual application, output TJ will be given by: TJ_{out}=DJ_{in} + ΔDJ + √[(TJ_{in}- DJ_{in})² + (ΔTJ - ΔDJ)²]
- 7) Specifications are standard for 50 μm or 62.5 μm multimode fiber
- 8) At 4.25Gbps



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ELECTRICAL PIN ASSIGNMENTS (SHOWN FOR DUAL PORT CONFIGURATION ONLY)

PIN	CHANNEL NO.	DESCRIPTION	LOGIC NOTES
1	1	Tx Data +	AC COUPLED
2	1	Tx Disable	TTL/CMOS
3	2	Rx Data +	AC COUPLED
4	2	Rx Detect	TTL/CMOS
5	3	Rx Data +	AC COUPLED
6	3	Rx Detect	TTL/CMOS
7	4	Tx Data +	AC COUPLED
8	4	Tx Disable	TTL/CMOS
9	1	Tx Data -	AC COUPLED
10	-	Ground	
11	2	Rx Data -	AC COUPLED
12	-	VCC (+3.3V)	
13	3	Rx Data -	AC COUPLED
14	-	Ground	
15	4	Tx Data -	AC COUPLED

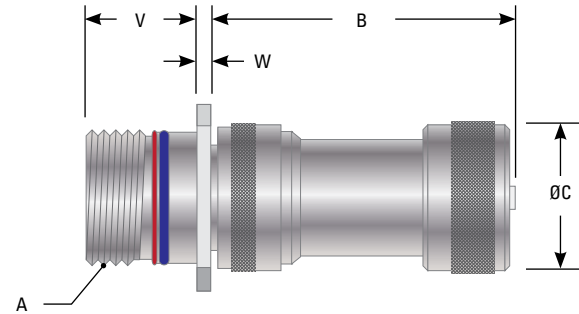
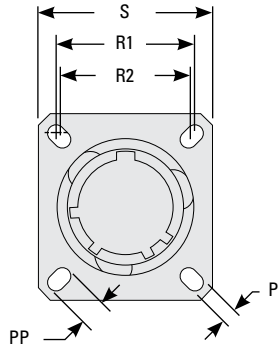
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	MAX.	UNITS
Storage Temperature	T _s	-55	+110	°C
Supply Voltage	V _{cc}	-0.5	+4.0	V
Differential Input Voltage (p-p)	V _{DIFF}	0.25	2.4	V
RX Output Current	I _o	-25	+25	mA
Relative Humidity	RH	0	90	%
Total Module Power Dissipation	P _{diss}		360	mW

TRANSCIEVER ENVIRONMENTAL QUALIFICATION

- Temperature cycling from -55°C to +125°C for 110 cycles
- Mechanical Shock of 5 shocks, 3 axis, 1500g level peak, 0.5ms pulse duration, half-sine pulse
- Random vibration from 20 to 2,000 Hz with peak acceleration of 20 g's.
- Moisture resistance tor 10 cycles at 90% humidity
- Steady state life test for 1000 hrs at +95°C
- ESD resistance per MIL-STD-883, Class II

MECHANICAL DIMENSIONS



SHELL SIZE	A		C	V	W		P	PP	R1	R2	S
	ACME	NOM			NOM	MAX					
15	1.0000-.1P-.3L-TS-2A	2.102 [53.4]	1.070	0.820	0.083	0.098	0.128	0.194	0.969	0.906	1.220
			[27.2]	[20.83]	[2.1]	[2.5]	[3.25]	[4.93]	[24.61]	[23.01]	[31.0]
17	1.1875-.1P-.3L-TS-2A	2.102 [53.4]	1.21	0.820	0.083	0.098	0.128	0.194	1.062	0.969	1.311
			[30.7]	[20.83]	[2.1]	[2.5]	[3.25]	[4.93]	[26.97]	[24.61]	[33.3]
19	1.2500-.1P-.3L-TS-2A	2.102 [53.4]	1.36	0.820	0.083	0.098	0.128	0.194	1.156	1.062	1.437
			[34.5]	[20.83]	[2.1]	[2.5]	[3.25]	[4.93]	[29.36]	[26.97]	[36.5]
21	1.3750-.1P-.3L-TS-2A	2.102 [53.4]	1.48	0.790	0.083	0.126	0.128	0.194	1.250	1.156	1.563
			[37.6]	[20.07]	[2.1]	[3.2]	[3.25]	[4.93]	[31.75]	[29.36]	[39.7]
23	1.500-.1P-.3L-TS-2A	2.102 [53.4]	1.60	0.790	0.083	0.126	0.154	0.242	1.375	1.250	1.689
			[40.6]	[20.07]	[2.1]	[3.2]	[3.91]	[6.15]	[34.93]	[31.75]	[42.9]
25	1.625-.1P-.3L-TS-2A	2.102 [53.4]	1.70	0.790	0.083	0.126	0.154	0.242	1.500	1.375	1.811
			[43.2]	[20.07]	[2.1]	[3.2]	[3.91]	[6.15]	[38.10]	[34.93]	[46.0]



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CONNECTOR INSERT ARRANGEMENTS

• Channel Assignment: All 16 AWG cavities are available for optical channel use per MIL-T-29504/4 and /5. Any cavities not used for fiber optics are available for electrical contacts. See MIL-STD-1560 for insert configurations.

• Transceiver socket insert receptacles mate with standard pin insert plugs per MIL-DTL-38999

FRONT FACE OF PIN INSERTS SHOWN

SHELL SIZE & INSERT ARRANGEMENT	15-5	15-97	17-8	17-99	19-11
NUMBER OF CONTACTS	5	8 4	8	21 2	11
CONTACT SIZE	16	20 16	16	20 16	16

FRONT FACE OF PIN INSERTS SHOWN

SHELL SIZE & INSERT ARRANGEMENT	21-16	21-29	21-39	23-21	23-54
NUMBER OF CONTACTS	16	19 4 4	37 2	21	40 9 4
CONTACT SIZE	16	20 16 12	20 16	16	22D 16 12

FRONT FACE OF PIN INSERTS SHOWN

SHELL SIZE & INSERT ARRANGEMENT	23-97	23-99	25-4	25-20	25-24
NUMBER OF CONTACTS	16	11	48 8	10 13 3 4	12 12
CONTACT SIZE	16	16	20 16	20 16 8* 12	16 12

FRONT FACE OF PIN INSERTS SHOWN

SHELL SIZE & INSERT ARRANGEMENT	25-29	25-37	25-43	25-46	25-62
NUMBER OF CONTACTS	29	37	23 20	40 4 2	8 4
CONTACT SIZE	16	16	20 16	20 16 8	16 8

*8 AWG TWINAX

